

WHAT IS CLAIMED IS:

1. A medical instrument holding device capable of holding a medical instrument having a long member to be inserted into the interior of a subject, comprising:

5           a grasping member having a longitudinal shaft and to be grasped by an operator,

          a holding portion provided on the grasping member and capable of holding the medical instrument so as to extend the long member in a direction different from  
10          that of the longitudinal shaft of the grasping member,

          a ball joint element arranged above or below the axis of the longitudinal shaft of the grasping member and connected to the grasping portion,

          an arm portion having a movable free end, and

15          a ball joint acceptant portion supporting the ball joint element provided on the free end of the arm portion in a ball joint manner.

2. The medical instrument holding device according to claim 1, wherein the arm portion

20          comprises:

          a fixed portion fixed to a floor or operating table,

          a connecting arm connected to the fixed portion,

          an acceptant arm provided with the ball joint  
25          element or the ball joint acceptant portion,

          a plurality of link arms connected to the connecting arm and the acceptant arm via articulations,

and

a counter weight provided on at least one of the plurality of link arms so that the balance of moment of rotation produced at the ball joint element or the ball joint acceptant portion provided on the acceptant arm is maintained when the medical instrument is held on the holding portion.

3. A medical instrument holding device capable of holding a medical instrument having a long member to be inserted into the interior of a subject, comprising:

a grasping member having a longitudinal shaft and to be grasped by an operator,

a holding portion provided on the grasping member and capable of holding the medical instrument so as to extend the long member in a direction different from that of the longitudinal shaft of the grasping member,

an arm portion having a movable free end,

a ball joint element provided on the free end of the arm portion, and

a ball joint acceptant portion connected to the grasping member and arranged above or below of the axis of the longitudinal shaft of the grasping member to support the ball joint element in a ball joint manner.

4. The medical instrument holding device according to claim 2, wherein the device further comprises a braking portion provided in the articulations of the arm portion and between the ball joint

element and the ball joint acceptant portion to switch the articulations as well as the ball joint element and the ball joint acceptant portion into a fixed condition and a free condition.

5           5. The medical instrument holding device according to claim 4, wherein the braking portion comprises electro-magnetic brakes and a controller which controls the electro-magnetic brakes, and

the grasping portion is provided with a switch  
10       which instructs the fixed condition or free condition of the braking portion to the controller.

6. The medical instrument holding device according to claim 1, wherein one end in the longitudinal direction of the grasping portion has  
15       an L-shaped crank form, and the proximal end of the medical instrument is connected the one end to provide a space in the longitudinal direction.

7. The medical instrument holding device according to claim 1, wherein the device further  
20       comprises a connecting member which is capable of moving the grasping member and the ball joint element in the longitudinal direction of the grasping member.

8. The medical instrument holding device according to claim 1, which further comprising:

25       an attitude detector provided in the grasping member and comprising a pointing portion pointing the vertical direction and a detecting portion rotatably

supporting the pointing portion to detect a tilted angle,

a U-shaped member pivotally supporting the grasping member,

5 a shaft journaled by the U-shaped member and provided with a connecting bar which is detachably fitted in the grasping member,

a motor provided at one end of the shaft to rotate the shaft, and

10 a control means for controlling the rotation of the motor on the basis of detected results by the attitude detector.

9. The medical instrument holding device according to claim 1, wherein the longitudinal  
15 direction is substantially at right angles to an insertion direction which coincides with an axial direction of the long member.

10. The medical instrument holding device according to claim 1, wherein a line connecting  
20 a gravity G of a structure constituted of the medical instrument and the grasping member to the position P of the ball center of the ball joint element is substantially parallel to an insertion direction which coincides with an axial direction of the long member.